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ABSTRACT

As a result of survey assessments which suggested a limited supply of science instructional resources in the Northaeastern Kansas area, the INSTEP (Integrative Network for Science Teaching Exploration and Practice) project was developed. Twenty-two 2nd-12th grade teachers from six school districts participated during 7 months of the project. The purpose of the project was to orient teachers to the potential of resource exchange. The project objectives included: (1) involving teachers in the development of instructional materials; (2) focusing teachers' attention on the potential of inquiry instruction; (3) improving the networking skills of teachers; (4) increasing the exchange of ideas among the project's teachers; (5) utilizing meeting, electronic mail services, and school site visitations; and (6) reinforcing the resource exchange process. The INSTEP Project's activities were based on both the Project 2061 report and the project's goals and assumptions. The purpose of this paper is to illuminate factors that might influence involvement when orienting teachers to resource exchange. Results are discussed in terms of lesson plan development activities, interschool inquiry activities, and project involvement. (KR)

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INSTEP: Teacher orientation to the potential of resource exchange

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Introduction

The INSTEP project was initiated as a result of Delphi and survey assessments which suggested a limited supply of science instructional resources in the Northeastern Kansas area (Hess, 1989; LaShier, Epps, and Nelson, 1989; and Andersen, 1989). Twenty-two, 2nd-12th grade teachers from six school districts participated during seven months of the project. Initially, teachers' reported interest in: developing materials, sharing ideas, and increasing their computing skills for instruction and communication. The purpose of the project was to orient teachers to the potential of resource exchange. Due to the diversity of teachers' interest, expertise and geographical location, one goal of the project was to develop a system of support that would involve teachers during resource exchange. The following objectives were designed to support the teachers during the project:

1) Involve teachers in the development of instructional materials; to focus teachers' attention to the potential of inquiry instruction.

2) Improve networking skills of teachers; to increase the exchange of ideas among the project's teachers.

3) Utilize meetings, electronic mail services, and school site visitations; to reinforce the resource exchange process.

The project's assumptions were basic to resource exchange: 1) instructional material development provides the opportunity to better understand both the content and the instructional strategies of focus, 2) networking provides a means to overcome limited ideas and expertise, and 3) exchange of resources requires communication, involvement, and support. Based on common interests, networking is thought to achieve both resource exchange and a sense of community (Sarason, Carroll, Maton, Cohen, and Lorentz; 1977). Henry (1958) suggests that one's "personal community" involves a group of people through which one can rely for support and approval. As a consequence of access to a limited supply of resources, the networking process is thought to influence involvement and expand teachers' notions about both resources and associated personal relationships. The INSTEP Project's activities were based on both the Project 2061 report (1989) and the project's goals and assumptions. The purpose of this paper is to illuminate factors that might influence involvement when orienting teachers to resource exchange.

Activities

Based on Project 2061's ecosystem concept, teachers developed lesson plans and an interschool inquiry. Both activities were designed to increase the teachers' awareness for implementation demands and potential classroom usefulness. To facilitate the development process, teachers were introduced to the elements of the Integrative instructional strategy, electronic mail services and contribution procedures of the UNITE computer network. The electronic mail service was designed as a mechanism for teachers to review contributed materials, and to

conference during interschool activities. These activities were thought to promote involvement among the teachers during the project.

Due to the project's extended program, seven meetings, six hours per day, provided a forum to share ideas and concerns about science instruction and project activities. Questionnaire data were used at the end of each meeting to document teachers' issues and concerns. School-site visits were also provided by the staff to offer technical support and gather information about teachers' needs. Through discussion and an open-ended questionnaire, the last meeting was designed to facilitate improvement of an interschool inquiry and to document needs that might improve efforts in future projects. The meetings, school-site visits, and collected data were thought to extend teacher support during the school year to increase project cohesiveness

Results

Lesson Plan Development Activities

During the summer meetings, teachers' concern for using computers seemed to override concerns for developing lesson plans. Teachers reported concerns about their skills and for computer compatibility in their schools. Even though questionnaire data indicated: agreement in the teachers' understanding the elements for lesson plan development; less agreement was expressed for their understanding of how to use the computer system and concerns for involvement needed to develop lesson plans. Eleven lesson plans were contributed during the September meeting. Subsequent data indicated teachers' agreement in understanding the lesson plan review process and interest in involving others in the project's activities; but less agreement in concerns for time to review lesson plans and use of student feedback in lesson plan design. Some teachers seemed more aware of the involvement necessary to contribute lesson plans.

The fall meetings identified teachers' concerns while they were teaching in their schools. The group's concerns were focused by the constraints of the schools' settings. For example, hardware compatibility and accessibility, and time to contribute lesson plans were factors discussed by the teachers. Questionnaire data indicated an increased teachers' awareness of the time necessary to contribute lesson plans, and the limitations provided by school settings. One teacher seemed to summarize the group's concerns in the following comment:

> "Each INSTEP workshop becomes more interesting and practical. There were a lot of good points that were brought up in today's workshop that needed to be addressed. Among those are 1) is there really a need to evaluate the lesson plans?, 2) time involved with reviewing, is there a quicker way?, and 3) computer accessibility within the school."

Teachers indicated that efforts spent at home would better serve their computer network needs. These concerns seemed to reflect the pervading quality of the rules of school settings.

Interschool Inquiry Activities

The interschool inquiry activity seemed more effective in involving teachers than lesson plan development. Teachers introduced two ideas for inquiry: 1) research to establish a baseline of leaf stomata data (Case, 1990) for comparison over time and 2) a school building audit to explore energy efficiencies and social climate. Teachers reported that novelty, curriculum relevancy, practicality, and a "hands on" quality were reasons for their involvement in the inquiry. They also reported that other school activities, scheduling concerns, curriculum agenda, student skills, and data transmission were challenges to the success of the inquiry.

Teachers framed the value of the inquiry in the degree of their involvement vs. changes in their students' behavior. Teachers spent 3-6 hours in implementation and students were expected to: estimate, measure, categorize, and use equipment. Teachers reported that students' seemed excited about the group's effort. What teachers learned from the inquiry might be reflected in the following quotes:

> "The newness of the project and the idea of information sharing with other schools intrigued them [students]. This lab time became a little more important to them than just receiving a good grade."
>
> "Cooperative learning, sharing and their vocabulary was enhanced. I became aware of areas that needed to be addressed."
>
> "I'm not sure any "new" knowledge was constructed. I did borrow microscopes from another teacher in the district and developed a new relationship here. I also discovered that my Level VI students could effectively use a microscope with only a little knowledge."

During the last meeting, the discussion seemed to improve the usefulness of the inquiry for some of the teachers. The teachers discussed how to use the collected data during instruction. One teacher commented:

> "I appreciated the comments from teachers at different grade levels today. Ideas about comparing stomata from different kinds of trees and comparing leaves collected at different times of the year was excellent. Ideas from a 3rd grade teacher about her methods of using the microscope were outstanding. This discussion made me feel the value of communication with teachers before beginning a cross-school inquiry."

The meeting generated teacher ideas about graphing techniques, comparisons and ratios, and establishing baselines for future efforts. One teacher stated:

> "I intend to implement ideas generated this morning and continue this research, e.g., counting stomata this spring. Next year I'll do a better job because I'll plan a better study and use the data to help students do science fair projects. I can use the data to make a sample science fair project."

The ideas and observations discussed during the meeting seemed to increase the value of the inquiry to the teachers.

Project Involvement

Teachers' involvement in the INSTEP project varied. Many teachers reported that their initial involvement resulted from administrative requests. However, others indicated interest in use of computer technology, and sharing ideas or materials. Why teachers continued their involvement seemed less clear. Teachers seemed bound by their original commitment. One teacher stated:

> "I had made a commitment to do it [participate in the project] and it was valuable in allowing contacts with other teachers of science (from all levels). The lesson plan model was valuable it seems to be an effective style"

On the other hand, when teachers are given time to "wrestle" around with other's ideas and concerns, perhaps bonding occurs that effects their continued efforts. Some teachers indicated desire to share ideas with others. One teacher stated:

> "I became totally challenged by the presentation of an idea. Interacting with other teachers in other school districts, and exchanging ideas and lesson plans with others became a challenge to me"

Most teachers indicated "team player" when asked about their degree of involvement. Teachers reported a mean of 30 hours spent on the project and mentioned various factors for their involvement:

> "My interest level grew, other teachers asked questions that I felt I could answer and explain."

> "As I became more proficient, [in] using the computer, my involvement changed. As an UNITE user, I've joined a small cadre of teachers in my building. My own self-esteem has grown because of my participation in INSTEP"

Perhaps the intermittent but continuous nature of the meetings, their forum-like quality, and the expectations to contribute influenced the teachers' boundedness. Meetings met seven days for a total of forty-two hours of time. During this time, teachers shared their ideas and experiences about instruction and concerns resulting from project activities. The teachers' involvement seemed to increase with time as people perceived themselves more proficient. Some teachers' began to provide service in other areas.

Conclusion and Implications

School settings provided challenges to the involvement of teachers' during the INSTEP project. Teachers were confronted with their own expertise, their students' skills, and conflicting school schedules and curricula. However, teachers were involved in various types of resource exchange. Some teachers contributed instructional materials and implemented their inquiry of choice. When provided the opportunity, teachers exchanged ideas and concerns about instruction. Because people perceive things differently, personal experience and social interaction seemed essential to the project. The projects' activities seemed to provide a mechanism to share ideas and concerns during the orientation process.

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